

Application No. 10/053,603

Reply to Official Action mailed April 11, 2005

The listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

Claim 1 (currently amended) A front end tuner for receiving modulated signals and selecting therefrom modulated signals in accordance with a frequency characteristic thereof and providing an output signal including information representative of said selected signals, comprising:

an output port coupled to the frequency conversion circuit for receiving an analogue signal about a centre frequency signal and for providing the analogue signal at the output port;

a frequency conversion circuit including a mixer for beating a local oscillator signal with signals within a predetermined band of frequencies to generate signals having frequencies within a predetermined channel band of frequencies and being representative of said selected signals and an oscillator for providing a signal having a frequency of between 40 MHz and 50 MHz and wherein the frequency conversion circuit is for providing the analogue signal about a centre frequency signal of between 40 and 50 MHz;

a signal converter circuit for receiving the signals having frequencies within the channel band of frequencies from the frequency conversion circuit and generating digitally encoded signal representations of the received signals;

the frequency conversion circuit and the signal converter circuit being in a form of an integrated circuit within a semiconductor substrate, the integrated circuit being connected with a first external terminal for receiving the signals within said predetermined band of frequencies, and being connected with a second external terminal for transmitting said digitally encoded signal representations.

Claim 2 (cancelled)

Claim 3 (cancelled)

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Claim 4 (currently amended) An integrated front end tuner as defined in claim 1, wherein the frequency conversion circuit comprises a first frequency converter for providing a signal to the signal converter and a second frequency converter for in conjunction with the oscillator providing the analogue signal about a centre frequency signal of between 40 and 50 MHz.

Claims 5-7 (cancelled)

Claim 8 (original) An integrated front end tuner as defined in claim 1, wherein the signal converter circuit comprises an analog to digital (A/D) converter.

Claim 9 (currently amended) A front end tuner for receiving modulated signals and selecting therefrom modulated signals in accordance with a frequency characteristic thereof and providing an output signal including information representative of said selected signals, comprising:

a frequency conversion circuit including a mixer for beating a local oscillator signal with signals within a predetermined band of frequencies to generate signals having frequencies within a predetermined channel band of frequencies and being representative of said selected signals;

a signal converter circuit for receiving the signals having frequencies within the channel band of frequencies from the frequency conversion circuit and generating digitally encoded signal representations of the received signals;

the frequency conversion circuit and the signal converter circuit being in a form of an integrated circuit within a semiconductor substrate, the integrated circuit being connected with a first external terminal for receiving the signals within said predetermined band of frequencies, and being connected with a second external terminal for transmitting said digitally encoded signal representations ~~An integrated front end tuner as defined in claim 1,~~ wherein the signal converter circuit comprises a codec.

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Claim 10 (currently amended) ~~An integrated front end tuner as defined in claim 1, further comprising:~~ A front end tuner for receiving modulated signals and selecting therefrom modulated signals in accordance with a frequency characteristic thereof and providing an output signal including information representative of said selected signals, comprising:

a frequency conversion circuit including a mixer for beating a local oscillator signal with signals within a predetermined band of frequencies to generate signals having frequencies within a predetermined channel band of frequencies and being representative of said selected signals;

a signal converter circuit for receiving the signals having frequencies within the channel band of frequencies from the frequency conversion circuit and generating digitally encoded signal representations of the received signals;

a decoder for converting a coded selection signal to provide a variable voltage signal of a corresponding voltage value; and

a local oscillator for generating the local oscillator signal at a frequency being controlled by the voltage value,

the frequency conversion circuit and the signal converter circuit being in a form of an integrated circuit within a semiconductor substrate, the integrated circuit being connected with a first external terminal for receiving the signals within said predetermined band of frequencies, and being connected with a second external terminal for transmitting said digitally encoded signal representations.

Claim 11 (currently amended) A front end tuner for receiving modulated signals and selecting therefrom modulated signals in accordance with a frequency characteristic thereof and providing an output signal including information representative of said selected signals, comprising:

a frequency conversion circuit including a mixer for beating a local oscillator signal with signals within a predetermined band of frequencies to generate signals having frequencies within a predetermined channel band of frequencies and being representative of said selected signals;

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a signal converter circuit for receiving the signals having frequencies within the channel band of frequencies from the frequency conversion circuit and generating digitally encoded signal representations of the received signals:

the frequency conversion circuit and the signal converter circuit being in a form of an integrated circuit within a semiconductor substrate, the integrated circuit being connected with a first external terminal for receiving the signals within said predetermined band of frequencies, and being connected with a second external terminal for transmitting said digitally encoded signal representations ~~An integrated front end tuner as defined in claim 1,~~ wherein the frequency conversion circuit is coupled with a third external terminal for receiving the local oscillator signal and the signal converter circuit is an analog to digital converter.

Claim 12 (currently amended) A front end tuner for receiving modulated signals and selecting therefrom modulated signals in accordance with a frequency characteristic thereof and providing an output signal including information representative of said selected signals, comprising:

a frequency conversion circuit including a mixer for beating a local oscillator signal with signals within a predetermined band of frequencies to generate signals having frequencies within a predetermined channel band of frequencies and being representative of said selected signals;

a signal converter circuit for receiving the signals having frequencies within the channel band of frequencies from the frequency conversion circuit and generating digitally encoded signal representations of the received signals:

the frequency conversion circuit and the signal converter circuit being in a form of an integrated circuit within a semiconductor substrate, the integrated circuit being connected with a first external terminal for receiving the signals within said predetermined band of frequencies, and being connected with a second external terminal for transmitting said digitally encoded signal representations ~~An integrated front end tuner as defined in claim 8,~~ wherein the signal converter circuit comprises an analog to digital (A/D) converter.

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wherein the signal converter circuit is a codec, said codec having a bidirectional digital signals input/output coupled with the second external terminal for receiving a coded signal and converting the coded signal to provide a variable voltage signal of a corresponding voltage value; and the integrated front end tuner further comprising:
a local oscillator for generating the local oscillator signal at a frequency being controlled by the voltage value.

Claim 13 (original) An integrated front end tuner as defined in claim 1, comprising a controller for selectably controlling the integrated front end tuner in one of a plurality of different modes of operation.

Claim 14 (original) An integrated front end tuner as defined in claim 13, comprising a controller input port for receiving a control signal to selectably vary the one of a plurality of different modes of operation.

Claim 15 (original) An integrated front end tuner as defined in claim 14, wherein the controller comprises colour-correction circuitry for adjusting portions of the digitally encoded signal representations representative of colours in dependence upon the control signal in one of a plurality of different modes of operation.

Claim 16 (original) An integrated front end tuner as defined in claim 14, wherein the controller comprises sound-correction circuitry for adjusting portions of the digitally encoded signal representations representative of sounds in dependence upon the control signal in one of a plurality of different modes of operation.

Claim 17 (currently amended) A front end tuner for receiving modulated signals and selecting therefrom modulated signals in accordance with a frequency characteristic thereof and providing an output signal including information representative of said selected signals, comprising:
a frequency conversion circuit including a mixer for beating a local oscillator signal with signals within a predetermined band of frequencies to generate signals having

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frequencies within a predetermined channel band of frequencies and being representative of said selected signals;

a signal converter circuit for receiving the signals having frequencies within the channel band of frequencies from the frequency conversion circuit and generating digitally encoded signal representations of the received signals;

a controller for selectably controlling the integrated front end tuner in one of a plurality of different modes of operation;

the frequency conversion circuit and the signal converter circuit being in a form of an integrated circuit within a semiconductor substrate, the integrated circuit being connected with a first external terminal for receiving the signals within said predetermined band of frequencies, and being connected with a second external terminal for transmitting said digitally encoded signal representations ~~An integrated front end tuner as defined in claim 13~~, wherein the plurality of different modes of operation includes a power saving mode, a performance mode, and a limited functionality mode.

Claim 18 (original) An integrated front end tuner as defined in claim 13, wherein the controller is responsive to a received signal and data provided thereto relating to a signal portion of interest.

Claim 19 (original) An integrated front end tuner as defined in claim 13, wherein the controller is responsive to selection data provided thereto.

Claim 20 (original) An integrated front end tuner as defined in claim 19, wherein the controller is for selecting a mode of operation in response to the selection data provided thereto by an individual operating the front end tuner.

Claim 21 (original) An integrated front end tuner as defined in claim 13, wherein the controller is responsive external parameters.

Claim 22 (currently amended) A front end tuner for receiving modulated signals and selecting therefrom modulated signals in accordance with a frequency characteristic

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thereof and providing an output signal including information representative of said selected signals, comprising:

a frequency conversion circuit including a mixer for beating a local oscillator signal with signals within a predetermined band of frequencies to generate signals having frequencies within a predetermined channel band of frequencies and being representative of said selected signals;

a signal converter circuit for receiving the signals having frequencies within the channel band of frequencies from the frequency conversion circuit and generating digitally encoded signal representations of the received signals;

a controller responsive to external parameters for selectably controlling the integrated front end tuner in one of a plurality of different modes of operation;

the frequency conversion circuit and the signal converter circuit being in a form of an integrated circuit within a semiconductor substrate, the integrated circuit being connected with a first external terminal for receiving the signals within said predetermined band of frequencies, and being connected with a second external terminal for transmitting said digitally encoded signal representations ~~An integrated front end tuner as defined in claim 21,~~ wherein the external parameter is power and wherein the controller is for changing a mode of operation of the front end tuner in response to a change in a power profile of power provided thereto.

Claim 23 (currently amended) A receiver for receiving program information having been modulated on a carrier signal of a frequency within a predetermined range of frequencies, comprising:

a plurality of filter devices including a first filter having a pass band for passing signals of frequencies within the predetermined range of frequencies with lesser attenuation than signals of other frequencies, and a second filter having a pass band limited to a channel range of frequencies consistent with passing information signals representative of said modulated carrier signal;

a frequency conversion circuit including a mixer for beating a local signal with signals passed by the first filter to generate signals being representative of said modulated

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carrier frequency signal at frequencies within the channel range of frequencies for pass filtering by the second filter;

a signal converter circuit for generating digitally encoded signal representations of any signals passed by the second filter and including a signal port for providing the digitally encoded signal representations:

at least the frequency conversion circuit and the signal converter circuit residing in a form of an integrated circuit within a semiconductor substrate and the integrated circuit being connected with an external terminal for transmitting the digitally encoded signal representations; and,

a TV processor within a microcomputer chip, coupled to receive said digitally encoded signal representations:

TV display and sound elements coupled with the TV processor; and

a frequency synthesizer having an output coupled with said integrated circuit for providing the local signal to the frequency conversion circuit, and being responsive a code from the TV processor for generating the local signal at a frequency to facilitate said pass filtering of said signals being representative of said modulated carrier frequency signal.

Claim 24 (cancelled)

Claim 25 (currently amended) A receiver as defined in claim 23 [[24]], wherein the frequency synthesizer is also within the microcomputer chip.

Claim 26 (original) A receiver as defined in claim 23, wherein the signal converter circuit is a codec and further comprises an analog out for providing the local signal in response to coded signals, the receiver further comprising:

a TV processor coupled to receive said digitally encoded signal representations from the codec and to provide the coded signals to the codec; and

TV display and sound elements coupled with the TV processor.

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Claim 27 (withdrawn) A method of channel selection in a TV, receiver having an integrated circuit tuner including, a mixer for mixing an analog local signal with received signals, and an analog to digital signal converter for providing digitally encoded signal representations of selected channel signals; and the TV receiver further having a microcomputer chip including a TV processor for accepting command signals from a TV user and for processing said digitally encoded signal representations, preparatory to video display and audio reproduction by TV display and sound elements in the TV receiver, the method comprising the steps of:

- a) generating a command code signal in response to a channel selection command signal from the TV user;
- b) digitally synthesizing the local signal in response to the command code signal, to effect reception of the selected channel signals;
- c) from time to time determining a difference between a variable parameter of the selected channel signals and a predetermined parameter and modifying the command code signal toward reducing the difference.

Claim 28 (withdrawn) A method of channel selection in a TV receiver having an integrated circuit tuner including, a mixer for mixing a local signal with received signals, and a codec for providing digitally encoded signal representations of selected channel signals; and the TV receiver further having a microcomputer chip including a TV processor for accepting command signals from a TV user and for processing said digitally encoded signal representations, preparatory to video display and audio reproduction by TV display and sound elements in the TV receiver, the method comprising the steps of:

- in the microcomputer chip, generating a command code signal in response to a channel selection command signal from the TV user;
- in the codec, providing the analog local signal in response to the command code signal; and
- in the microcomputer chip, from time to time fine tuning the command code signal by determining a difference between a variable parameter of the selected channel

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signals and a predetermined parameter and modifying the command code signal toward reducing the difference.

Claim 29 (withdrawn) A front end tuner for receiving modulated signals and selecting therefrom modulated signals in accordance with a frequency characteristic thereof and providing an output signal including information representative of said selected signals, comprising:

an input port for receiving a television data signal including signals within a predetermined band of frequencies;

a frequency conversion circuit including a mixer for beating a local oscillator signal with the signals within the predetermined band of frequencies to generate signals having frequencies within a predetermined channel band of frequencies and being representative of said selected signals; and,

an output port for providing the generated signals,

wherein the local oscillator oscillates at an oscillation frequency more than 60MHz and wherein the generated signals are about a centre frequency of approximately the oscillation frequency.

Claim 30 (withdrawn) A front end tuner according to claim 29, wherein the oscillation frequency is above 400MHz.

Claim 31 (withdrawn) A front end tuner according to claim 29, wherein the oscillation frequency is at or above one half of the bandwidth of the predetermined band of frequencies.

Claim 32 (withdrawn) A front end tuner according to claim 31, wherein the oscillation frequency is at or above 500MHz.